Claims

1. An optical sensor comprising:

a bandpass filter;

a first detector responsive to a low wavelength passed by the bandpass filter; and

a second detector responsive to a high wavelength passed by the bandpass filter.

2. The optical sensor of claim 1 wherein the detectors are formed in a stacked relationship.

3. The optical sensor of claim 1 wherein the bandpass filter comprises an adjustable band pass filter.

4. The optical sensor of claim 1 wherein the bandpass filter comprises a Fabry-Perot etalon.

5. The optical sensor of claim 1 wherein the detectors are respectively formed of $Al_xGa_{1-x}N$ and $Al_yGa_{1-y}N$ where $y<x$.

6. The optical sensor of claim 1 wherein the detectors are respectively formed of $Al_xGa_{1-x}N$ and InGaN.

7. The optical sensor of claim 1 wherein the first detector absorbs wavelengths of approximately 250 to 300 nanometers.

8. The optical sensor of claim 1 wherein the second detector absorbs wavelengths of approximately 290 to 390 nanometers.

9. The optical sensor of claim 1 wherein the detectors are formed on a sapphire substrate.

Express Mail: EK930858145US
February 22, 2002
H0002243
Barrett E. Cole, et al, Inventors
Kris T. Fredrick, Attorney

10. An optical sensor comprising:

a bandpass filter;

an in-band source that illuminates a sample proximate the bandpass filter;

a first detector responsive to a low wavelength passed by the bandpass filter; and

a second detector responsive to a high wavelength passed by the bandpass filter.

11. The optical sensor of claim 10 wherein the in-band source is selected from the group consisting of laser, light emitting diode, ultraviolet source, and superluminescent diode.

12. The optical sensor of claim 10 wherein the detectors are formed on a sapphire substrate, and luminance from the sample passes through the sapphire substrate prior to being absorbed by the detectors.

13. The optical sensor of claim 10 and further comprising charge detectors coupled to the detectors.

14. The optical sensor of claim 13 and further comprising:

a first substrate;

a second substrate; and

a third substrate in which the charge detectors are formed.

15. The optical sensor of claim 14 wherein the third substrate comprises further circuitry associated with the charge detectors.

16. The optical sensor of claim 10 and further comprising:

a first substrate having the bandpass filter formed thereon;

a second substrate having the first and second detectors formed thereon.

17. The optical sensor of claim 16 wherein the first and second substrates are positioned such that first substrate is positioned between the biosample and the second substrate.

18. The optical sensor of claim 17 wherein the first and second substrates are coupled to each other by bump bonds.

19. The optical sensor of claim 10 wherein the bandpass filter comprises a Fabry-Perot etalon.

20. The optical sensor of claim 10 wherein the detectors are respectively formed of $Al_xGa_{1-x}N$ and $Al_yGa_{1-y}N$ where $y<x$.

21. The optical sensor of claim 10 wherein the detectors are respectively formed of $Al_xGa_{1-x}N$ and InGaN.

22. The optical sensor of claim 10 wherein the first detector absorbs wavelengths of approximately 250 to 300 nanometers and the second detector absorbs wavelengths of approximately 290 to 390 nanometers.

23. The optical sensor of claim 10 wherein the sample is inorganic, or a biosample.

24. An optical sensor comprising:

a bandpass filter supported on a glass substrate;

a first detector formed on a sapphire substrate responsive to a low wavelength passed by the bandpass filter; and

a second detector formed on the first detector responsive to a high wavelength passed by the bandpass filter.

25. The optical sensor of claim 24 and further comprising a laser for illuminating a biosample proximate the glass substrate.

26. The optical sensor of claim 25 wherein the bandpass filter is positioned between the glass substrate and the sapphire substrate and wherein biofluorescence from the biosample travels through both the glass substrate and the sapphire substrate to reach the first detector.

27. The optical sensor of claim 26 wherein the biofluorescence also travels through the first detector to reach the second detector.

28. A method of detecting biosamples, the method comprising:

illuminating the biosample to cause fluorescence of the biosample;

filtering the fluorescence to pass a band of desired wavelengths;

detecting the passed wavelengths with a first detector having a low wavelength adsorption capability; and

detecting the passed wavelengths with a second detector having a high wavelength adsorption capability.

29. The method of claim 28 and further comprising detecting charges on both the first and second detectors.

30. The method of claim 29 and further comprising determining a signature of the biosample from the detected charges and comparing the signature to known signatures of biosamples.

31. The method of claim 28 wherein the first detector absorbs wavelengths of approximately 250 to 300 nanometers and the second detector absorbs wavelengths of approximately 290 to 390 nanometers.

32. An optical sensor comprising:

a bandpass filter;

an array of pixels, each pixel comprising;

a first detector responsive to a low wavelength passed by the bandpass filter; and
a second detector responsive to a high wavelength passed by the bandpass filter.

33. The optical sensor of claim 32 wherein the pixels are arranged in a two dimensional array.

34. The optical sensor of claim 32 wherein the pixels are arranged in a linear array.

35. The optical sensor of claim 32 wherein the detectors are formed in a stacked relationship.

36. The optical sensor of claim 32 wherein detectors of different pixels are responsive to different wavelengths.

37. The optical sensor of claim 32 wherein the first detector in each pixel is responsive to the same wavelengths, and the second detector in each pixel is responsive to the same wavelengths different than the wavelengths of the first detector.

38. The optical sensor of claim 32 wherein the bandpass filter comprises an adjustable band pass filter.

39. The optical sensor of claim 32 wherein the bandpass filter comprises a Fabry-Perot etalon.

40. The optical sensor of claim 32 wherein the detectors are respectively formed of $Al_xGa_{1-x}N$ and $Al_yGa_{1-y}N$ where $y<x$.

41. The optical sensor of claim 32 wherein the detectors are respectively formed of $Al_xGa_{1-x}N$ and InGaN.